



MAGAZINE

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by Gordon Ellis (Paints Division)

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TITANIUM

The New Metal with Big Possibilities

By Dr. Maurice Cook (Joint Managing Director, Metals Division)

Titanium has big things in its favour: it combines great strength with great lightness; it is as non-corrosive as stainless steel; and it is extracted from cheap and abundant ore. But it has one big drawback: it is too expensive except for special purposes such as aircraft components. Therefore, on a new and cheaper production route.

This article is an abstract of the 24th autumn lecture delivered by

IT may seem somewhat odd to refer to titanium as a new metal when in fact its existence was known more than 150 years ago. It is however, only within the last five years or so that the metal has been produced on a tonnage basis by industrially worked processes.

Until a few years ago few people had even seen it; it is not yet a common metallurgical commodity, and few metallurgists have experience of it or know much about it. This, therefore, is the justification for referring to it as a new metal, which it is, inasmuch as we are just now witnessing its industrial birth.

The pioneer work of Kroll was followed up by research teams of the United States Bureau of Mines, who were responsible for an immense amount of valuable work—the prelude to the first commercial production of the metal in the United States in 1948, in which year about 30 tons was made. This figure was about doubled two years later, and in 1952 it is reported to have been about 1000 tons.

Various figures have appeared for the estimated U.S. production for this year—up to about 10,000 tons—but recently much lower figures have been quoted for what the actual production is likely to be. It has been suggested that outputs of the order of 20,000 tons per annum may be reached within the next two or three years in the United States. In Great Britain commercial production has so far been on a very limited scale, but within the next two or three years it may well reach a figure approaching 2000 tons. Interest is also being shown in its manufacture in other countries.

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Dr. Maurice Cook to the Institute of Metals on 21st September last.

During the past six or seven years or so an enormous amount of scientific and technological work has been carried out on titanium, mostly in the United States, but not only there. Many millions of pounds have been spent, and not only is the effort still proceeding, but it is being intensified. Never before has there been in so short a time so much research activity directed to a single industrial metal.

Clearly there must be a reason and a justification for this, and indeed there is. Briefly, it is that the metal has attractive physical and mechanical properties, a high strength/weight ratio, and outstandingly good resistance to corrosion generally. Its importance as a very desirable if not uniquely suitable material for several aircraft components was quickly recognised. Evaluation tests were carried out on metal compacted from powder before techniques for melting in quantity were devised and developed. Limited though these tests were at the time, the results were enough to open up to the imagination a vista of possibilities extending far beyond the uses which present prices justify.

It is, however, a far cry from the present position of expensive production and processing to what still is the purely imaginative one of manufacture at price levels even approaching those of the more costly basic metals. All the major problems connected with the extraction, melting and fabrication of titanium—and there are indeed many—stem from its very high degree of reactivity when hot.

Molten titanium attacks all the known refractory materials used for lining metal melting furnaces and for

making crucibles. For this reason, and because of the solubility of nitrogen and oxygen in titanium which causes embrittlement, and to a lesser extent because of its high melting point, which at present is accepted as 1725° C., special equipment and procedures involving melting in vacuo or in argon have to be developed. These are far more costly to operate than the techniques usually employed for melting metals.

Many serious problems will have to be solved before titanium can become a readily available metal. Formidable as many of these are, there is justification for a reasonable measure of optimism. Notwithstanding the difficult and complicated nature of the extraction process at present most generally used, the amount of progress both in metal production and in improvements to the process itself are quite impressive.

Success in any such developments as scaling up and substantially improving existing production methods or the devising of superior new ones would undoubtedly result in price reductions. This would conceivably in due time bring titanium into the range of basic metals in common usage. Its abundant and wide distribution over the world in the form of workable ores would make this possible once the cost of extraction is reduced to an economic level.

The chief ores of titanium are ilmenite—a combination of iron and titanium oxides—and oxide rutile. Both derive originally as decomposition products from granites and pegmatites. Titanium ores have long been used as a source of titanium dioxide for the paint and other industries, the world production of ilmenite concentrates amounting in 1951 to no less than 1,183,000 tons. This mineral occurs as massive deposits in Canada, the United States, Norway and Russia, and as beach sands in Queensland, Travancore and Florida. Rutile, which occurs to a much less extent, is found principally in Australia and the United States.

Abundant Supplies of Ore

From information already known about deposits it is evident that abundant supplies of ore exist. For example, one deposit in eastern Quebec alone is estimated to contain the equivalent of about 25 million tons of titanium metal; and in addition to rich ores, there are vast quantities of lower-grade ores in many parts of the world. In short, and as far as the future can be foreseen, there are supplies of titanium ores to meet production levels comparable with those of today's basic metals.

Commercially pure titanium can be readily hot worked by forging, rolling, extrusion and other conventional methods, but in general it is more resistant to cold working than are most non-ferrous alloys usually produced in wrought form.

One feature of titanium which adds seriously to the difficulty of cold working is its unfortunate tendency to seize on other metals during sliding contact with them under pressure. So far no lubricant has been found which will prevent seizure of metal-to-metal surfaces, but this can be overcome to some extent through avoiding metal-to-metal contact by oxidising the surface of the titanium or depositing on it layers of other substances to serve as vehicles for the lubricant.

Scrap Metal Problems

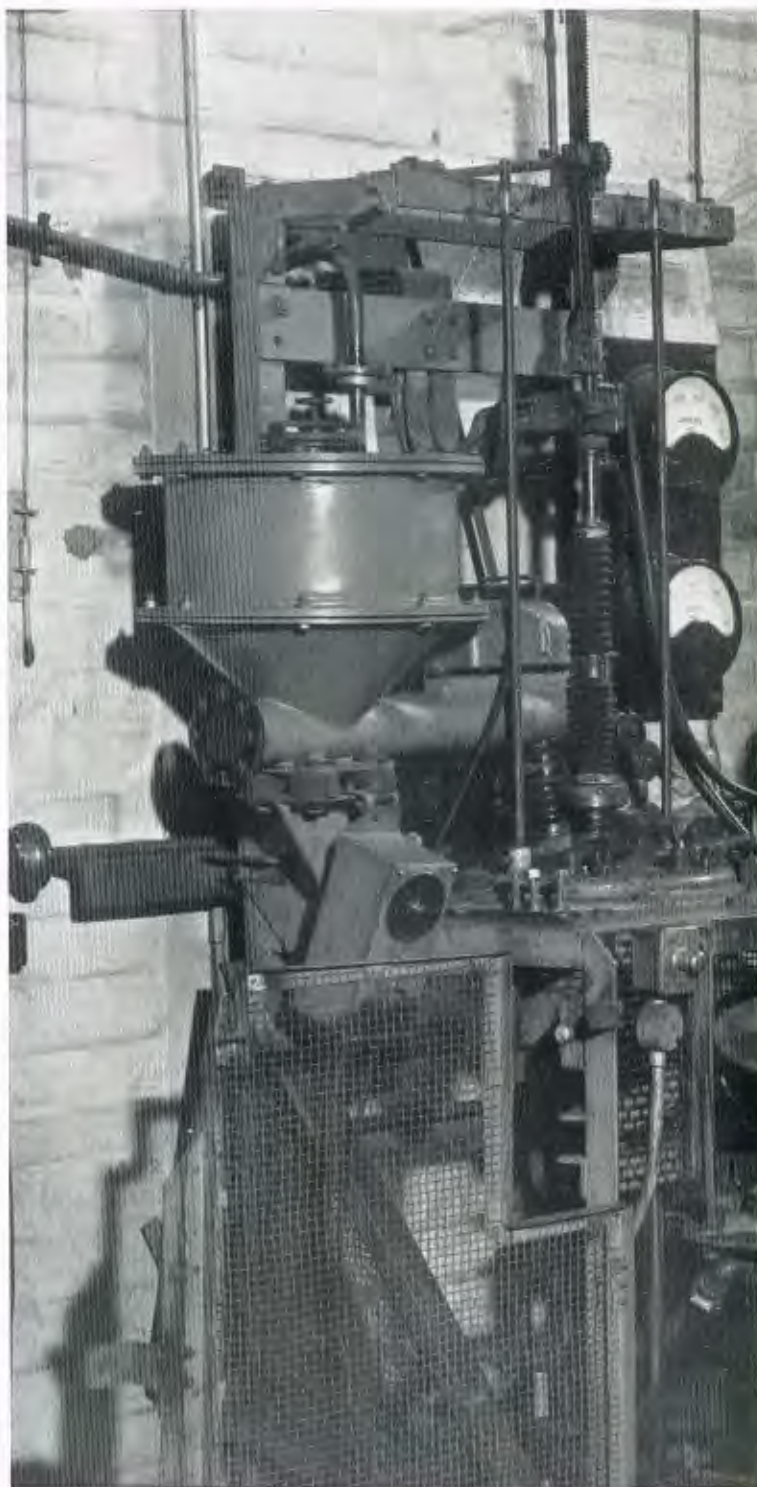
Another factor which looms large, if indeed not largest, in the economics of titanium production is that scrap metal cannot be remelted and returned to the production cycle. This arises partly from the fact that massive scrap cannot be fed into arc furnaces of the type at present employed for melting titanium, and partly from the necessity of avoiding cumulative contamination which would result from repeated melting and fabrication. Considerable effort is therefore being directed towards developing furnaces capable of melting scrap in the charge and in devising processes for the removal of at least some of the contamination before remelting.

Joining presents numerous problems, many of which, especially those concerned with brazing and soldering and with the welding of alloys, are not yet solved. Commercially pure titanium can, however, be readily welded by electrical resistance methods and also by means of argon arc techniques, provided that precautions are taken to shield from atmospheric contamination not only the molten welded metal but also all heated parts of the base metal, including the back of the weld.

Resistance to Corrosion

The high strength/weight ratio is the feature of titanium and its alloys which is chiefly responsible for their demand and use in aircraft. The other excellent characteristic of the metal is its resistance to corrosion. The early optimism about this has been abundantly justified. This outstanding resistance to corrosion is attributed to the presence of a protective oxide film which is most stable in oxidising environments. The behaviour of the metal is similar to that of stainless steel, but in addition the film on titanium is resistant to penetration by the chlorine ion, so that the metal is resistant to moist chlorine.

Its resistance to sea-water and to marine conditions generally is of a very high order indeed. Furthermore, it is not corroded by fouling organisms in sea-water, nor is it corroded in this medium when it is coupled, for example, to stainless steel or cupro-nickel. It is resistant to cold nitric acid up to 98% concentration, sulphur compounds, strong alkalis, many organic acids, chlorinated



solvents, and cold aqua regia. It is not affected by most foods or by body fluids, and being non-toxic it could be used for many purposes in surgery.

As soon as ductile titanium became available, even in small quantities, attention was immediately turned to alloying possibilities. Some elements showed promise as alloying ingredients, especially iron, chromium, manganese, molybdenum and aluminium. From this work



Small-scale furnaces for experimental extraction of titanium at Metals Division

emerged a limited number of quite useful alloys which have been developed on a production scale since about 1950.

The sort of alloys that have so far been available are all much stronger but less ductile than commercially pure titanium. They retain their properties better at high temperatures and have superior creep properties. As a result of alloying, the superlatively good corrosion resistance of

the metal does not appear to be impaired, and in general the alloys possess the excellent fatigue and corrosion properties that characterise the metal.

It is too early yet to forecast the eventual pattern of alloy development, but the fact that in so short a time alloys have been produced with a strength/weight ratio better than that of any other available material augurs well for the future.

THE KILN BURNER

THE first remark Bill Lewis made was a little baffling. "My back end's too low," he said. I learned later that it is part of his job to keep his back end up, or, if it is too high, to keep it down.

Bill is one of the important men at Billingham whose pre-occupation with back and front ends is helping to swell Britain's dollar reserves. Every day's work he puts in saves dollars that might otherwise go to pay for American sulphur, for he is part of a team that produces sulphuric acid—one of the most important industrial materials in the world—without the use of elemental sulphur.

He is known as a kiln burner, but his kilns are very different in appearance from those tended by the burners at Lime Division. Instead of standing up like huge chimneys, they are supported on their sides a few feet from the ground. One of Bill's pair was cold and under repair when I visited him. Twice the height of a man and more than 200 ft. long, the steel cylinder looked more like a section of London's Tube railway than anything else.

The other kiln, hard at work, presented a very different picture. Electrically driven cogwheels rotated it, and a low rumble came from the inside. It looked like one of the kilns you see at a cement works, and I said as much.

"It is a cement kiln, in a way," Bill said.

"It's a cement kiln, but you use it for making sulphuric acid?" I suggested.

"We use it for making sulphuric acid *and* cement, both at the same time."

It is hard to swallow but quite true. This ingenious process, first worked out by chemists in the 1920's, converts four cheap ingredients into two highly prized industrial materials. They leave the kiln in the form of sulphur dioxide gas (which after taking up more oxygen and with the addition of water becomes sulphuric acid) and cement clinker, which becomes cement as the builder knows it after having gypsum added to it at Billingham's Casebourne Works.

Bill explained that "back and "front" end were the terms used for the two ends of the kilns. His station is by the front, or firing, end, where powdered coal is shot in from a gun-like tube to provide the heat necessary for the complicated chemical

reaction that takes place inside. The chief ingredient of the dry mix that is fed to the back end of the kiln is anhydrite, mined in the cavernous anhydrite mine 800 ft. below the Billingham factory. It is this which provides the sulphur for the sulphur dioxide, and some of the alumina and silica for the cement clinker; sand from Teesmouth makes the silica up to the required amount.

The finely ground and perfectly dry ingredients, known as the "raw meal," are fed into the back end of the kiln. Anhydrite is very reluctant to give up its sulphur, and the only thing that will persuade it to do so is fierce heat. Bill has to keep the front end of the kiln at about 1400° C., and the back end, too, has its appropriate temperature. Thermometers at three points in the kiln, giving temperature indications on a panel beside him, help him judge how the kiln is behaving. But he relies chiefly on his practised eye.

"After you've been a kiln burner for twenty years," he said, "there's not much you can't tell by looking at it."

"Look at that," Bill said, inviting me up to an observation port. "But use this dark glass or you'll be blinded." The inside of the kiln was certainly no sight for sore eyes, and staggering enough for sound ones. The jet of powdered coal was a fierce flame 40 ft. long. Beyond that, swirling gases obscured the view. In the foreground a mass of white-hot dust was tumbling out of sight.

Bill found it hard to explain how a glimpse of the kiln's interior could tell him if the reaction was going well, but he told me that the colour of the inferno we had been looking at and the distance up the kiln he could see were his main indications.

The white-hot dust we had seen was the cement clinker, which had taken several hours to travel down the sloping kiln. After being cooled it falls into a bunker, looking like so much grey-coloured sand. At the same time hot sulphur dioxide gas is rushing out of the other end of the kiln. If the burner knows his job the clinker will contain no sulphur and the gas will contain plenty. In the hour I had been talking to Bill he had made 7½ tons of cement clinker, enough gas to provide the same amount of 100% sulphuric acid, and had effected a neat saving in dollars. Another kiln like Bill's is being installed at Billingham—and no wonder!

M.J.D.



Bill Lewis (Billingham Division)

Central Council Meets Again

An unusually harmonious meeting at Blackpool

TO someone outside the Company, the Central Council at Blackpool in November might have appeared a very quiet and calm affair. No weighty topics came under debate; no big concessions were asked for or denied. Orators with the reputation of breathing fire breathed only small sparks, and the thunderers thundered but faintly.

"If this is joint consultation," the outsider might have remarked, "then give me the bad old days!" But the even tenor of affairs at Central Council was actually a tribute to the success which joint consultation enjoys in I.C.I. The most important matters are often thrashed out at Works or Division Councils, and it is at these levels that some of the best debates as well as the most impassioned speeches are found.

For this reason the highlights at Blackpool were to be found on this occasion chiefly in the important statements from the platform: in the Chairman's statement on the Company's progress and future; in Sir Ewart Smith's reports on profit-sharing and safety; in Mr. E. T. Grint's report on the changes being made in the Staff Grade Scheme; in Mr. R. A. Banks' explanation of extended periods for the sickness benefit scheme. These and other speeches from the platform are reported below.

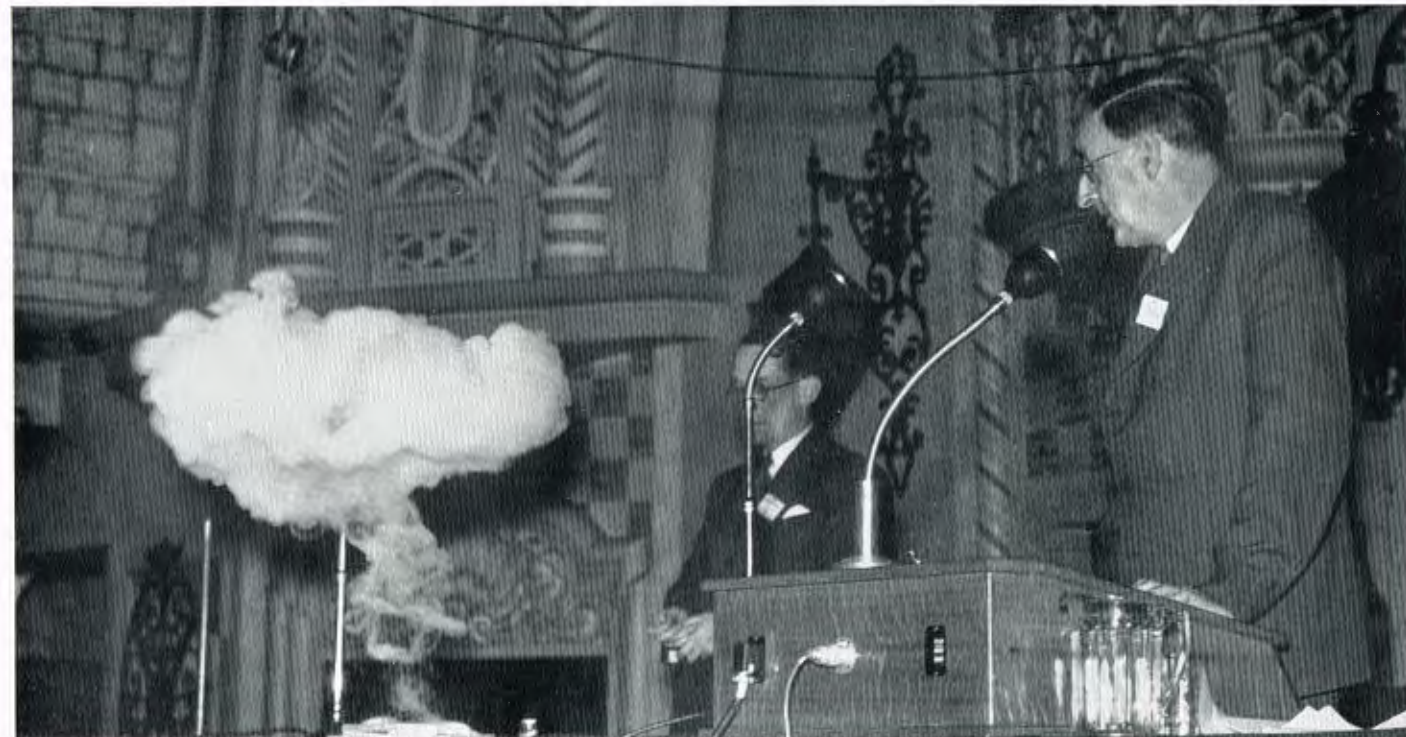
Two innovations made this a memorable Central Council. The first was the unusual arrangement made after the dinner on the evening before the Council meeting. Sir Edmund Hillary and Mr. T. Bourdillon gave an illustrated lecture on the ascent of Everest, and the applause they received must

have amply allayed any qualms the organisers of the Council may have felt in making such a new departure. The other was Dr. James Taylor's after-lunch talk, "Explosives in the Service of Man." The talk was punctuated by explosions and ended with a flying display by jet-propelled model aircraft.

In the course of his opening speech the Chairman said:

We have now returned to a more competitive state of affairs. Broadly speaking, there is no raw material shortage. Supplies are reasonably abundant and, for the first time, prices of raw materials have tended to fall rather than to increase. At the sales end our products are more freely available to our customers, and the export trade is no longer held up by shortages of supplies. Two important competitors, Germany and Japan, who have been out of the world market since the war, have now returned. The result of all this is that we now have to sell our goods against active competition instead of being besieged by anxious customers beseeching us to supply them as we were in the immediate post-war period. I do not find this change unhealthy: on the contrary, I welcome it. But it does mean that we have got to be constantly aware of the needs of our many customers and ensure that we supply them with what they want at the right quality, at the right price and at the right time.

On the other hand, we are faced with new difficulties in the form of shortage of sterling and import restrictions in certain of our overseas markets. This is the other side of the same coin. A number of countries, including some of our traditional markets, are short of sterling and therefore have not got the



Dr. J. Taylor, Nobel and Metals Divisions group director, demonstrates the use of explosives to the surprise and amusement of his audience

wherewithal to pay for such British products as they may wish to import. For instance, our trade with Brazil has been suffering as a result of such shortage. Other countries have found it necessary to restrict the amount of imports so as to preserve a proper balance of trade and of payments. In 1952 our trade with Australia suffered quite severely as a result of import restrictions. I think, therefore, that it was particularly creditable that in the face of these difficulties the value of our exports last year should have reached the record total of £62 million. This all-time record in direct exports was largely the result of a higher volume of trade in alkali and in fertilizers, especially to the countries of the Far East.

Last Year's Trading

The second comment I would like to make on 1952 is on the profit figures as shown in the Consolidated Accounts. Our total receipts from the sale of our products, from dividends on our investments, from royalties and so forth amounted to more than £280 million. Out of these total receipts we had to meet our outgoings, that is to say money for our raw materials, money for you and me, services, and then depreciation; and these altogether totalled £250 million. Thus we were left with a balance of nearly £30 million, which has been called our Initial Surplus in our short and illustrated version of the year's results.

Some might regard this initial surplus as our profit, but this is not so because it has to be remembered that the whole of that figure is not available for distribution to our stockholders. Over 40% had to go to the Government for taxation, and more than half of what remained was ploughed back into the business. It is only through ploughing back considerable sums and by asking the public to subscribe new money from their savings that we are able to go on building new plants and installing more up-to-date equipment which themselves are essential if we are to remain competitive in the world's markets. Such steps are necessary and substantially help to secure the

continued prosperity of the Company; in short, continuing work for you and me and for those who come after us. The actual sum distributed in dividends to our various classes of stockholders was just about £6,250,000, which represented only 2½% of our total receipts. Personally I believe this to be a modest and not unreasonable percentage.

Capital Ploughed Back

In thinking about some of those money figures of our Company, the changing nature of its whole financial structure has to be kept in mind. Since 1945, in the eight years up to 1952, we have spent in installing plant of all kinds, particularly for new products and for more economical methods, no less than £124 million; and I would ask you to note that the capital on which our dividends are declared has not been correspondingly increased. By and large this new capital (this vast sum which we have spent in our Company) of £124 million is now becoming productive and yielding its due measure of increased products with their appropriate profits.

After commenting on the international situation, the Chairman turned to the question of joint consultation. He informed Central Council that a management committee had been set up to review the operation of Works Councils and take stock. He continued:

One of the ways by which we try to make industry a more human and less mechanical community is through what we call joint consultation. Joint consultation is a phrase which is bandied about very much these days, and it may mean anything or nothing. I would hesitate myself to suggest a definition, but I think we should agree that joint consultation includes a variety of methods by which various types of employees in a company—it may be factory payroll people on one hand and direct administrative management on the other—can come together to discuss and to share information upon



The Chairman, Dr. Fleck, with Sir Edmund Hillary



Mr. J. Parkes (Alkali), chairman of workers' representatives, at the microphone

matters directly affecting their interests and thus to make that concern a better community in which to work. We would hope that these interchanges of views would very frequently result in general agreement, but the main fact should be that frank discussion has taken place and that all possible has been done to make the underlying reasons appreciated by each other. Adequate opportunity for understanding—that is the firm basis of joint consultation.

Informal Consultation

I would emphasise the variety of methods by which joint consultation can be practised. There is no royal road. Within the Company we follow a number of complementary methods, the most important of which should be consultation on the job. That is the informal consultation which should be taking place the whole time at the workplace where the actual job is being done. Its essence is respect for each other and a willingness to discuss one's problems without the fear that the other fellow will abuse one's confidence.

Then there are the more formalised methods of joint consultations, which in large organisations like ours are so necessary and so important. In our company we have two formal methods of joint consultation. One is the negotiating machinery with the trade unions, and the second is the Works Council Scheme. The first may be regarded more strictly as collective bargaining, but nevertheless it is an important form of consultation. The second formal method is through the Works Council Scheme, and it is one with which we in this room are all familiar and in which all of us here participate.

Works Council Review

Taking the general attitude of industry towards closer consultation in 1929, there is no doubt that the creation of the Works Council Scheme then was a bold and progressive step of which we have every reason to be proud. But nothing in life must be taken for granted. I and some of my colleagues feel that the time has come for us to review the workings of the Works Council Scheme and to take stock of the position. What have we achieved so far? Could we achieve more in the future? Do our constitution and procedure meet present and future needs? Is the balance of emphasis between the Central Council and the Divisional Councils correct? These are the sorts of questions that we must be asking ourselves. Here let me make it perfectly clear that I am not suggesting for one moment that the Works Council Scheme is not working well, but rather the very fact that it has been a success makes it the more important for us to ensure that it continues to be a success. With a living institution continued success can be ensured only through growth and improvement.

With this in mind we have, as a first step, set up a Management Committee to review the operation of the Works Council and to take stock. In setting up this committee we are following the common practice of the Company to review all our schemes from time to time to see how they are working and to see whether they can be improved. I have no idea what the committee are going to tell the Board and I do not want to anticipate any suggestions which they may wish to put forward, but I should like to give an assurance to this Council that if the committee suggests any changes there will be adequate opportunity for discussing them before any such changes come into effect.

Since the establishment of this committee the signatory

trade unions have approached us about the future of the Works Council Scheme. Some of you may have read in trade union journals that there is a feeling that the Works Councils have outlived their usefulness. We have had discussions with a sub-committee of the trade unions signatory to the Company Agreement, and we have told them we do not share the view that the Works Councils have outlived their usefulness.

Assurance to Trade Unions

We recognise, however, that in any human organisation there is always room for improvement. At the same time I wish to reassure our friends in the trade unions that the Works Council Scheme is not a rival institution to the trade union movement. I should like to repeat the words used by Lord Melchett at the inaugural meeting of the Works Council in April 1929. Lord Melchett said this, and I cannot better his words today even in the light of all the experience we have had. "We do not wish our Works Council system, which we look on as a domestic matter to enable us to keep in touch with those for whom we are directly responsible and for whom we feel responsible in our domestic matters, to be looked on as being either a challenge to or as in competition with or as in any way hostile to our relations with trade unions and their representatives." I feel that puts the relationship between the trade unions and the Works Council very clearly. I do not feel that any reasonable person could regard the two as being in conflict, nor do I believe that because we have intimate dealings with those trade unions, who number very many of our employees among their members, it should absolve us from the duty and wisdom of creating adequate machinery for discussing our day-to-day difficulties within this great organisation.

Staff Grade Promotion

The conditions of promotion to Staff Grade were next defined by Mr. E. T. Grint, Chief Labour Officer, who said:

At the last meeting I made a statement in which was outlined the Board's intention regarding the future of the Staff Grade Scheme. In that statement I was authorised to give you the definition—or perhaps the specification, if I may use that term—of the men who in the Board's opinion should in future be on Staff Grade. Perhaps I should just repeat that again, because what I have to say subsequently has a bearing on that particular definition. It was "one who has proved himself reliable and willing, who exercises a good influence in the works, and can be trusted to respect the privileges which Staff Grade would confer on him."

I also said in that statement at Scarborough that the procedure which we intended to follow was an initial selection by a panel of selectors, all of whom should have a direct knowledge of the employee concerned. That panel of selectors would do their best, and would receive every assistance from the Company, to make the selection on as uniform a basis as possible throughout the whole concern. As you can imagine, and as I mentioned in May, we had a fair amount of work to do in order to work out, shall I say, the operative details. We have been giving thought and consideration to them, and, I hope, now have them in some tidy shape. It was felt, therefore, that since the statement which was made in May was necessarily a preliminary statement inasmuch as we had not done all the work necessary to give it in its final form, I should at this meeting let the Council know what had happened in the interim.

The characteristics of the Staff Grade man in that definition



A group of Salt Division workers' representatives: W. Britland (Stoke Works), L. G. Rusher (Carrickfergus), G. R. Carmen (Weston Point), S. C. Brown (Middlesbrough) and C. Lewis (Stafford)

which I read out a moment or two ago were briefly: Reliability, willingness and good influence. They are perhaps in themselves somewhat general terms, and if we want to be sure, as we do, that in all parts of the Company the same standards are being observed in the selection it is necessary that we should give some guidance to the assessors on the degrees of reliability, willingness and so on that a Staff Grade man should possess to be worthy of promotion.

Qualities Defined

It is quite obvious that in any group of men some will be more reliable than others, some more willing or have a better influence; and the overall definition does not imply that the Staff Grade man shall be perfect in any or all of these respects. Neither is it our intention, when we are selecting in future, to compare one man with another, but rather to judge each man individually to a standard which I think could best be described as fair and reasonable in each one of these three main categories. In short, if a man is considered to be fair and reasonable in each of those respects, he can expect to be promoted to Staff Grade in future; and if he does not secure promotion—I think this is an important point—he will have the right to ask and to be told in which particular respect he is considered to fall below standard, so that he may have a fair chance to effect an improvement and get on perhaps in the next assessment or when the next appointments are made.

Similar standards of performance and the same methods will be followed in the review of existing Staff-graders which was mentioned as a feature of the new arrangements in the statement made by me at Scarborough. I think it is only right to tell the Council that before this procedure was agreed it was put to a fairly thorough test, and we were encouraged by the results which we obtained. I do not want to make any pre-

dictions now as to how many people will be on Staff Grade under the new arrangements, but I think I would be permitted to say that we have good reason to think that the new arrangements will work well, and that in practice they will give results which will fulfil the hopes of the Board and the members of this Council who have from time to time been anxious to see the opportunities for Staff Grade promotion expanded well beyond the old quota limits.

No Fixed Percentage

There is, however, one point which I would like you to keep in mind. I have mentioned it before, but I think I should repeat it here. If we are judging people on merit—and providing a man is good enough there will be no bar to promotion—we may not get the same percentage of people in each and every works. I think you will see the point of that quite clearly. In the past the percentage has been a uniform one. In order that there shall be no disappointment, I thought it as well just to mention that point again.

There is one further point, that as the Staff Grade Scheme is being changed and we have to amend the Staff Grade code to embody the new features, we have taken the opportunity at the same time of making such alterations as were necessary to make clear paragraphs which were open to doubt, and in general to bring the code up to date. Every existing Staff Grade worker will receive a copy of the new code within, I hope, the next week or so.

The next item on the agenda concerned the remuneration to be given by the Company to employees called up for annual service with the Forces. Mr. E. T. Grint explained that a scheme had been evolved whereby a man's total pick-up would be made up by the Company to be not less than his average earnings up to a maximum of 15 days.

A statement on the Board's position with regard to the proposal for a profit-sharing scheme was then made by the Technical Director, Sir Ewart Smith. He explained that the proposal was still under consideration by a special committee consisting of himself and three other directors. "We have examined," he said, "every possible scheme of which we could learn or think, and I have to tell you now that so far we have not been able to find a scheme which completely meets the problems and complexities which would have to be dealt with. At the same time I want to tell you that we have not finished our deliberations, but it would clearly be wrong at this stage to lead you to think that a scheme can be found. Equally I do not want you to go away thinking that one will not be found."

Further Sickness Benefit

Mr. R. A. Banks, Personnel Director, then announced that the Board had decided to extend the maximum period for which benefit might be drawn under the I.C.I. Sickness Benefit Scheme. In future the maximum would be twenty-six weeks (instead of thirteen weeks) in any calendar year. The change takes effect from 1st January.

A number of routine matters were next dealt with. First the affairs of the Workers' Pension Fund were outlined by Mr. J. A. L. Young. Among the points he made was that 90% of eligible employees are now members of the Fund. He also drew attention to the fact that in the 'Trustees' Report the Fund's investments in I.C.I. now appear separately under the heading "Chemicals—Explosives." The Fund's holding in I.C.I. at the end of March 1953 was just over £1,200,000.

The safety report presented by Mr. H. R. Payne was a proud moment. It showed that in the first six months of 1953 an accident rate of less than one for every 100,000 hours worked had at last been achieved. Commenting on this, Sir Ewart Smith said that he now proposed to set a new target for

the Company—a target of 0.5 accidents per 100,000 hours. "I admit that the closer you get to zero the harder it becomes," he said. "But I am sure you will agree that we would not be true to ourselves and true to the people we represent if we rested on our laurels."

The meeting then went on to debate a resolution from Alkali Division that consideration be given to raising the I.C.I. Savings Bank rate of interest from $2\frac{1}{2}\%$ to 3%.

Mr. Young explained that the question of the interest rate was always under discussion. It had been specially reviewed in April 1953 in the light of the 1952 annual accounts; but the Bank's board of directors had decided that although the current income from investments might have warranted an increase in the rate of interest, this would not be prudent, as there was substantial depreciation on the Bank's investments due to a fall in market values, against which it was very necessary to make some increase in reserves.

Safety Boots Dilemma

Safety boots were next on the agenda. Alkali Division asked the Company to allow employees already issued with protective footwear to purchase two pairs of unsubsidised footwear per year. After some debate the motion was put to the vote and lost, but as there were more than ten votes in favour it was referred back to Division Councils.

Also referred back was an Alkali Division resolution asking that the Company give consideration to the introduction of an additional long service award where an employee retires after forty or more years' service.

The last resolution of the day was carried with only four dissentient votes. Also from Alkali Division, it proposed that prizes instead of medals should be given to members of the first and second teams in the I.C.I. First Aid Competition, and that prizes should also be presented to members of the team gaining third place.

HIMALAYAN HOLIDAY (continued from page 15)

We turned instead to the ridges above. The village headmen were most apprehensive that by going up high we should disturb the Gods in their mountain retreat, and that they in vengeance would bring storms and avalanches (both of which were only too frequent) and would destroy their ripening crops. After one of the headmen, who had served the British as a Gurkha, had intervened on our behalf, we were at last permitted to go, but for all too short an absence.

A local guide led us through a maze of woodcutters' tracks to the top of the forest; above 8000 ft. we were among magnolias and giant rhododendrons as big as an English oak tree and ablaze with bloom. At 12,000 ft. we were on the summer pastures in air of intoxicating purity, cool and infinitely clear, at last above the dust haze which in March drifts up from the hot plains of India. At 15,000 ft. we had come as far as the headmen would let us go.

We were above the spring snow line, walking over minor hilltops rather like the Lake District, but with the difference that ahead of us and on either side, and now very close, were the vast walls of rock and ice of the main Himalayan range rising still 10,000 ft. and more above us. Nobody but the

locals had ever seen this view before, and the many photographs I was able to take are unique.

When we got back to the village we found them a little ashamed. Determined to make amends for the way they had restrained us, they had arranged a monster party. The best dancing girls in the valley had been brought over to give us a show, and half the countryside turned out to watch. Matting was spread out before our tents, and against the background of the great mountains the girls danced for several hours, all dressed up in their gold ornaments and ceremonial clothes, and accompanied by drums and chanting Oriental songs. The local spirit, known as raksi, flowed like water from silver goblets, and the little left of our "foreign liquor" soon went in exchange.

Now our time was up, and it was sad to leave so soon these happy, honest, hospitable and hard-working people. It is easy to understand how those who have once experienced travelling in the Himalayas wish for nothing better than to be able so to travel indefinitely. For much as one appreciates the return to the comforts and the variety of civilised life, one sometimes wonders whether its complexity and its responsibilities do not impose too high a price.

Himalayan Holiday

By Robin Goodfellow (India Department)

The Himalayan foothills are of almost incomparable beauty. Few who work for their living have the chance of holidays there; but surely none has made better use of his opportunities than Robin Goodfellow, whose article conveys something of the fascination of exploring this lovely part of the world.

With photographs by the Author

WITH their broad foothill ranges the Himalayas provide for many tastes. To most people the "hill stations," which lie in a long chain from Kashmir to Darjeeling, offer merely an escape from the heat of the plains. One can enjoy civilised comforts in a climate like that of a perfect English summer in sight of the stupendous ranges of snow peaks forty and more miles away; they seem as detached and as unreal as scenery in a theatre.

The more adventurous can travel and camp further afield, to fish the lovely trout streams of Kashmir, where the scenery resembles the Tyrol. Or, more strenuously, one can clamber over the hillsides in pursuit of wild sheep, deer or bear. For those who can still afford it such trips are not as uncomfortable as might be thought. Tradition demands that in the East one should travel with all the comforts of home and with a caravan appropriate in size to one's self-importance. You take beds, chairs and tables, crockery and cutlery, food and drink, a tent fit for a maharaja, and a suitable retinue of servants and ponies.

The mountaineer has a different problem. His adventure begins after the snow line has been reached, and he can only feel wholly satisfied when he has set foot on the great peaks of the main Himalayan range.

So vast is the scale of the country that it takes at least a week or more—generally a fortnight—to reach the glaciers from the ends of the foothill roads beyond the hill stations. If pressed for time, he can establish a base camp at perhaps 15,000 ft. in a week or ten days after leaving civilisation; if he is exceptionally fit and accustomed to altitude, he can venture to make an assault on some relatively minor peak of say 20,000 ft. and return within the month. But it requires a great deal of good luck with

weather and with route-finding to bag one such peak in the space of even a month's holiday. Indeed, only one or two outstanding mountaineers have ever succeeded in doing so.

Unfortunately it needs two months, or preferably three, to make any serious attempt to climb a major Himalayan mountain. The giants like Everest demand a large and costly organisation and the expedition must be planned with military precision, as our successful party in 1953 has shown. But those who are content with 23,000 ft. can travel light and therefore cheaply, and it is in these more modest expeditions that climbers have found the greatest pleasures of Himalayan mountaineering. The mountaineers who can find the time and the finance for this are indeed to be envied.

The ordinary "world's worker" in the span of a short holiday must be content with less ambitious travels. The best he can do—and this is what I have done on many occasions—is to select a starting point in the foothills which can be reached quickly by road, or now in rare cases by air, and which is as near as possible to big mountains. He can then march in and climb the spurs of the peaks to 15,000 ft., or with luck to 18,000 ft., to look at the giants from a few miles away.

Emotions are mixed: one gazes at their unbelievable grandeur conscious that few have been so privileged, but one is denied the joys of climbing their airy snow ridges and of scrambling up their warm rocks, pleasures which are so readily to be found in a short holiday in the highly organised Alps.

However, Himalayan travel brings other rewards. I know few things more enjoyable than to travel through the foothills towards the great mountains. One has arrived



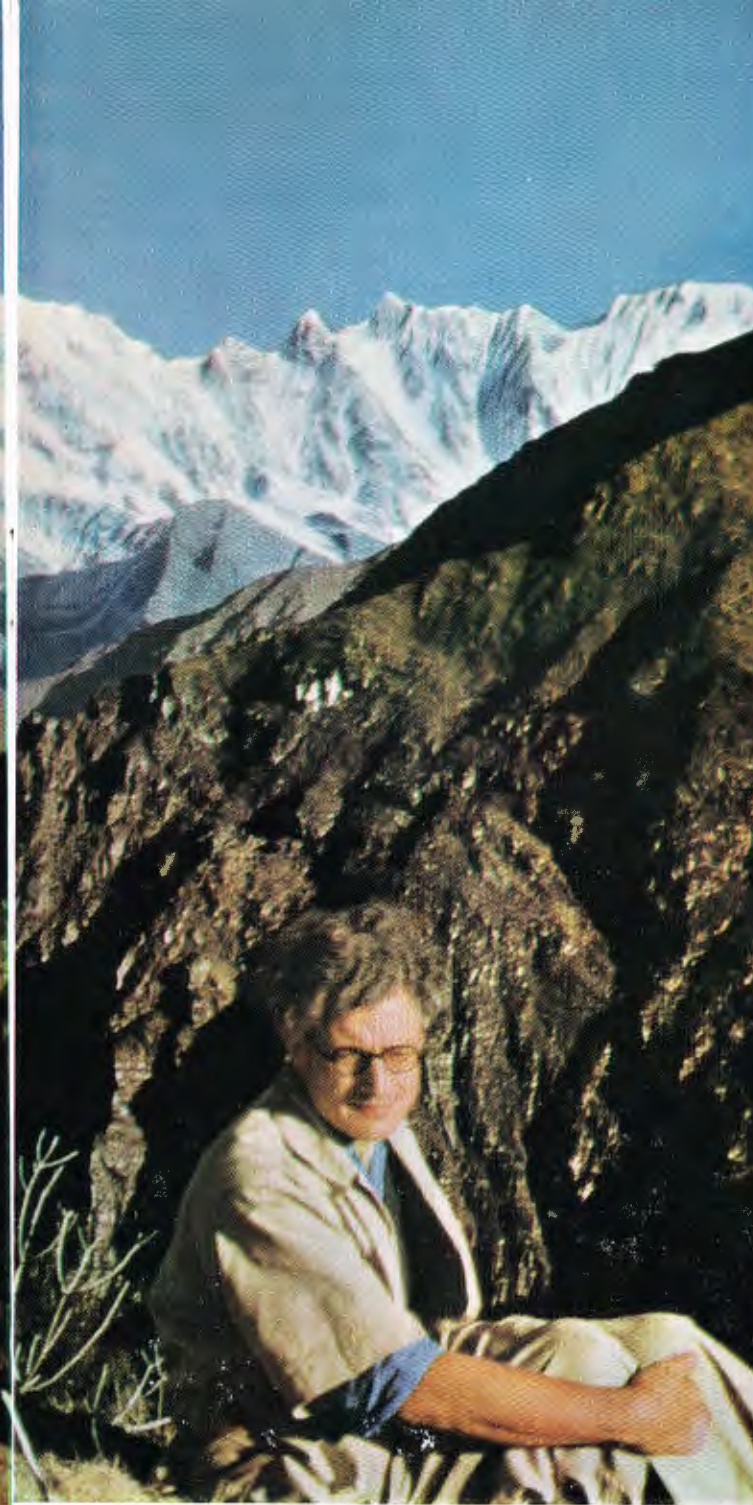
UNCLIMBED, PROBABLY UNCLIMBABLE, the peak of Machha Puchhare, known as the "Fish-tail" (23,000 ft.) towers party's Nepali guide who had shown the way through the forest.

at the end of the road with about 250 lb. of gear, the result of the most careful calculation of the party's requirements of tents, sleeping bags, mountaineering gear (just in case), food, cameras, lamps, kerosene, and kitchen equipment.

Waiting at the end of the road is the party's "sirdar," generally a Sherpa from Darjeeling; he will combine the duties of organiser of porters, cook and interpreter, and at a pinch he will be able to carry a load to a high camp. Half a dozen porters are readily picked up in the village,

for in these hills, where the tracks are too rough even for mules, all loads are carried by humans.

The first day's march is hot and dusty, for one may be only a few thousand feet up. There is every kind of anxiety: whether the porters will abscond with precious loads, whether the sirdar can make anything fit to eat from the local foodstuffs—for the more one can live off the country the better—and whether the tents, hired from the Himalayan Club in India, will keep the rain out.



in the background. In the foreground is the

But in a few days one has settled into the routine. The supreme physical fitness peculiar to mountain walking soon makes the six hours' daily march effortless, even though it generally means climbing up and down 5000 ft., over the ridges and down to the rivers. The long nights bring abundant sleep, for after the early dusk there is little else to do, and one is up again before 6 a.m. for another day's march. In the middle of the afternoon one may reach an enchanted glade, and one decides there and

then that there is no better place in the world to stop. One calls on the headman of the neighbouring village to ask permission to camp, to buy food, and to ask advice for the next stage of the journey. By an immense camp fire one watches the sun set on the fantastic ice peaks towering above to 25,000 feet.

Thus one travels until the last village under the mountains. Now the country gets more difficult. The tracks are little used and overgrown. One needs a local guide to find what is perhaps an old pilgrim trail through formidable gorges to the snout of a glacier which marks one of the many sources of the sacred Ganges. Here the real mountaineering begins; and for the ordinary holiday-maker it is time to return.

Journey in Nepal

Of the trips I have made one most to be remembered was a journey in Central Nepal at Easter in 1953. Until as recently as 1949 Nepal was virtually a closed country: only the specially privileged were allowed to make a rare visit to the Capital. Yet in 1953 we were able to get permission to travel in a part of Nepal in which nobody but the local inhabitants had previously set foot. With better luck still we were able to get on to an aircraft which had just started experimentally—and, we thought, hazardously—an internal air service.

A flight of half an hour from Katmandu, over the deep valleys and high ridges of the foothills, saved us a ten-day march; we landed on an improvised airstrip ringed by mountains and so rough of surface that it seemed a miracle that our Dakota remained in one piece. We were at Pokhara, the capital of Central Nepal, and a town as dramatically situated as any in the world. Towering above was the huge range of the Annapurna Himal, the highest peak of which, over 26,000 ft., was climbed by the French in 1950 from the other side with a very narrow margin of safety.

Our plan was to make straight for these mountains, and particularly towards a spectacular rock and ice spire of 23,000 ft., which resembles the Matterhorn on a far bigger scale; it has the impossible name of Machha-Puchhare, which means "fish-tail," and it dominates every view in the district.

We started in Indian heat, for Pokhara is only 3000 ft. up; the coral trees were in full blossom, scarlet on leafless branches against the blue skies. We set off through the main street, which has never known any form of wheeled transport. With this flying start we were able to reach the last village in only two days, but were dismayed to find it only 4500 ft. up. Ice-fluted peaks soared 20,000 ft. above us, and the valley ahead closed to an impassable gorge; its sheer walls were clothed with dense sub-tropical rain forest of tall trees draped with showers of white orchids.

(Photographs overleaf, text continued on page 12)



(Above) THE BAZAAR AT DARJEELING (7000 ft.). The yellow sign on the left shows the store of I.C.I. (India) Ltd.'s distributor. This is one of the highest places in the world where I.C.I. materials can be bought. (Below) AFTERNOON THUNDERSTORM in the gorges of the Annapurna Himal.



Hints on House Warming

By Gordon Nonhebel (I.C.I. Fuel Economy Section)

A warm house without draughts, a cheerful fire to sit by, and this without ruinous expense—we all want as much. But how to get it? Here I.C.I.'s fuel expert gives some extremely valuable advice.

IT has been said of the British family that it has more square feet of living accommodation per head than any other nation but in winter the smallest inhabitable area. Is the only part of your house which is comfortable in winter that within five feet of the fire-place, and this only when the fire is bright? Or is it comfortable anywhere in the living room? Standards of house heating are in fact so varied that before visiting other houses in winter my wife and I always discuss whether we should put on extra layers of clothes.

With the ever-rising cost of fuel, how are we to increase our area of comfortable space and make the most of our limited allocations of coal and coke? Full central heating by hot water pipes is certainly not the answer, even for those who can afford it, because large parts of the house would be heated unnecessarily. A recent development is heating by hot air. This is suitable for properly designed new houses, provided the warm air currents are directed to avoid giving hot heads and cold feet. But it will, I think, be some years before a reliable hot-air system competes in cost with conventional central heating.

A tremendous amount of effort is now being devoted by national research establishments to improve house heating. One of their recommendations is that to increase comfort

one should reduce the loss of heat from the whole house and not merely from the living room. Perhaps the greatest benefit is obtained by insulating the ceilings of the top floor, this being done simply by a thick felt of glass wool, slag wool or aluminium foil. The material is sold in rolls by some builders' merchants and can be laid without difficulty. When measuring the quantity required, remember that it will sag if laid across instead of between the joists (and do not put your foot through the ceiling!). There is also an insulating powder called Vermiculite which can be laid between the joists above the ceiling; this, however, cannot be taken up again if you move.

For comfort in living rooms and hall it is essential to eliminate draughts by sealing the many cracks in floors, windows and doors through which cold air can enter. You would be surprised if you measured them to find how many square inches of area they add up to. Special bronze strip can be bought for sealing windows and is specially useful for those which have to be opened even in winter. A very much cheaper form of sealing, which requires annual renewal, is transparent adhesive tape. It is best applied to the outside joints.

Fires need air, however, and if the sealing is too effective the fire will smoke, especially when freshly lit. The air for the fire should preferably come



Continental stove, highly efficient. Burns best with wood or coke.



Early Victorian coal waster



A late Victorian improvement with adjustable canopy

from the top of the windows and door or through the hearth between you and the fire. Some of my more enterprising friends have cut 4 in. square holes in the hearth in front of the fire to let air in from the space under the floor boards. This air enters the house through the ventilating grids in outside walls, and consequently draughts across the room are greatly reduced. Care has to be taken that hot embers and cigarette ends cannot get down the holes and start a fire under the floor. It is better to raise such air vents about a foot above the hearth in a duct fixed to the front of the mantelpiece and provide a damper in the duct; such an arrangement need not be unsightly.

Next come the curtains. The loss of heat from a glass wall (that is, the window) is several times that from a brick wall. The air in contact with the glass is cooled and falls from the window in a torrent, creating draught and causing loss of heat. Since windows with two layers of glass are still very expensive, it is best to have heavy (preferably lined) curtains reaching right down to the floor to keep out those cold air currents at night.

And now for the fire. The ordinary open grate is notoriously inefficient and consequently expensive to run. On the Continent rooms are heated by continuously burning closed stoves with efficiencies of up to 70%. The efficiency is that part of heat in the fuel which goes to heat the rooms of a house and does not simply disappear up the chimney.

Up to the present the English home has been based on an open fire with an efficiency of 20-25% on coal or 25-30% on coke. The improved open fires with sealed ash-

pits have no greater efficiency than the old stool grates when burning well but have the advantage of greater ease of control and ease of ash removal, and they usually have labour-saving built-in gas ignition. Coke will not burn well on stool grates.

With an ordinary open fire the chimney draws from the room four times the amount of air required to ventilate it. This is the reason for draughts, and even if these can be avoided by the careful placing of chairs and screens it is still necessary to heat this excess air unless it enters at the hearth. The Victorians did a little better by having adjustable canopies over the fire which could be closed in when the fire had burnt up, but few fireside sitters remembered to use them.

The open—close stove is a distinct improvement on the open fire as regards efficiency. It has a restricted chimney and even with the doors open draws only half the amount of air of the open fire. This type of stove supplies warm air and transfers 40% of the heat in the coal (50% when burning coke) into the room, but the radiant heat is only 10-20%. But stoves are less pleasant to sit by than the open fire, and some designs are not acceptable to many housewives. The type which sets into the chimney recess looks better but is far more expensive to install and cannot be taken away to another house without costly reinstallation of the landlord's original fixture.

The fuel saving with this type of stove is often illusory, as they are usually kept burning continuously, but they undoubtedly improve comfort. Incidentally, to get the same degree of comfort a higher room temperature is necessary with a stove or water radiators than with an open fire.

A further improvement in house comfort can be obtained by having a back boiler in one of these stoves with one or two radiators in the hot water circuit, at least one of these being in the hall. There are then less complaints of doors being left open by the children. The radiators need to be competently installed, however, to avoid water circulation problems.

As a compromise between the open fire and the open—close stove there are now coming on to the market convector open fires which can burn coal or coke, giving as much radiation as an ordinary open fire but also supplying warm air to the room. Most of these stand in front of the old fireplace and so may not be safe if the hearth is small. A recent improvement on these is the open convector fire, which has a restricted opening to the chimney with a damper which is opened only when lighting up. This has the advantage that the air drawn up the chimney is no more than necessary for ventilating the room; it can either be inset under the chimney (in which case it will be costly to fix) or stand in front of the chimney-breast like most open—close stoves.

Incidentally, a frequent reason for poor performance of stoves is faulty installation. It is important that no air can leak into the chimney through joints round the setting, including round the flue pipe. Advice on installation is given in Ministry of Works Advisory Leaflet No. 31, price 3d.

But just because you have a stove which will burn continuously day and night, do not feel that you *must* keep it going all night: it will certainly burn more fuel if you do.

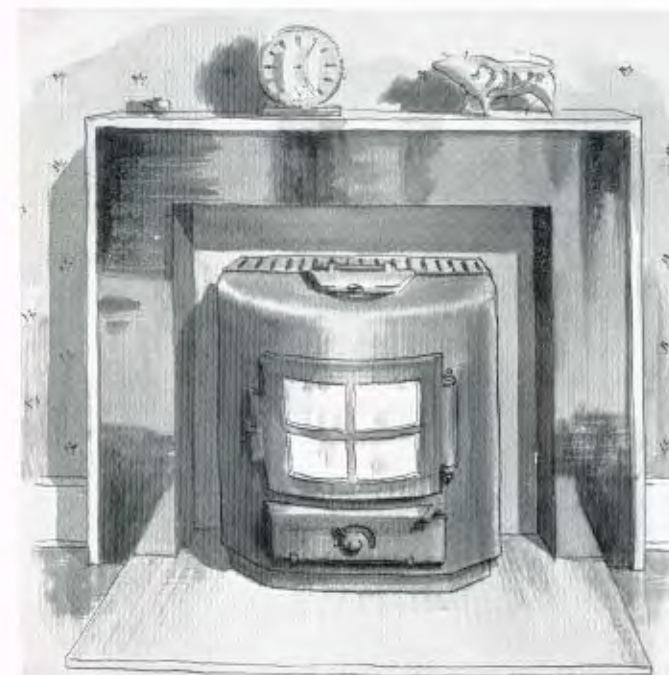
It is a pity that open—close stoves are not supplied with built-in gas ignition points so that they can be lit daily as easily as the improved modern open fires. They are no more trouble to clean and relight.

Use of more efficient coal-burning fires means that less smoke will be released in our towns and they will consequently be cleaner. Coke fires are, of course, smokeless and, properly managed, give better heating than coal fires. It does, however, seem necessary to liven up an open coke fire with coal or wood after about six hours' burning, because the fuel bed becomes filled with small coke which slows down combustion. A coke fire will never burn well for long if a deep fire bed is not maintained.

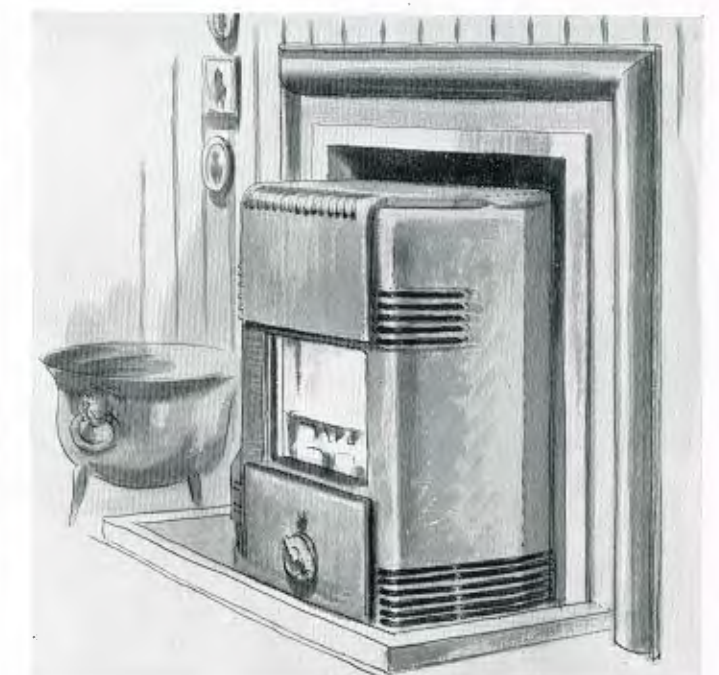
As regards rooms which require warming only occasionally, gas, electric or paraffin heaters are cheaper than solid fuel fires and far more convenient. The latest designs of paraffin stoves are odourless if kept clean and filled with the premium grade of burning oil. In many areas they give heat more cheaply than gas or electricity.

The centre of interest in a home on a winter's evening used to be the fire, but it is now moving to the television set. It may well be that the distraction of the flickering flames of an open fire will cause more people to install closed or open—close stoves, and they may find that the economy in fuel helps to pay for the television.

One final word. Unless you are fairly expert, always try to see the type of stove or fire you have in mind in somebody else's home before having it installed in your own.



Closed stove requiring anthracite, needs only occasional re-fuelling



Modern open—close stove. Burns coal or coke efficiently. Lack of beauty slows down sales.



RUSSELL M. CURRIE

POSSESSED of a gargantuan frame (6 ft. 2 in., 20 stone), a soft and almost musical voice which makes you want to listen to words which he knows how to use, and with a seemingly endless fund of both stories and statistics at his finger-tips, Russell Currie, head of Work Study Department, is a man not easily forgotten. He is, in fact, a personality in the fullest sense of the word.

Progress down almost any London street with this Chester-tonian figure is liable to be interrupted by hails from across the road from Far East friends who have not seen him for twenty years. Mutual recognition is instantaneous, for Currie has a memory for names and faces that is fabulous. If he fails to identify, when he is out and about the Divisions, any one of the 800-odd people who have so far attended Work Study courses in London, he takes it as a personal defeat.

His colleagues sometimes wisecrack that he should have been a salesman. This is their tribute to the success with which he has "sold" his enthusiasm for Work Study to all and sundry in the six years he has been with I.C.I.

"I'm the Aimée Semple Macpherson of Work Study," he is liable to say. "The only new thing about Work Study is the name." (This from the man who is recognised as the greatest authority on Work Study, certainly in Britain and maybe in the world!) "I just preach the gospel." And it is a fervent belief with Russell Currie that only by higher productivity can Britain cast off the shame of accepting charity.

By profession Russell Currie is an engineer and he started work as an apprentice in a Clyde shipyard. Before the war he was chief engineer at one of the largest waterworks in the world—in Shanghai.

I.C.I. NEWS

INDIAN BLASTING EXPLOSIVES PROJECT

AN agreement has been reached between the Government of India and I.C.I. to establish a new company to manufacture India's requirements of commercial blasting high explosives.

The development of mining in India and the large public expenditure on water, power, irrigation works and road building have so increased the demand for explosives that an explosives factory can now become an important factor in the national economy. When the factory goes into production, India will be self-sufficient in the manufacture of explosives.

The agreements between the Government of India and I.C.I. provide for the registration of a new company, to be known as Indian Explosives Ltd., with an authorised capital of Rs. 4 crores (£3,000,000). Initially half of this capital will be issued, of which 80% will be subscribed by I.C.I. and 20% by the Government of India. The balance of the capital required will be met by loans, of which a substantial portion is expected to come from the Industrial Finance Corporation of India.

A site has been selected for the factory close to the Bihar coalfields so as to give the best possible service to the coal-mining industry, which is the principal consumer of industrial explosives in India.

Under the agreements I.C.I., through Nobel Division, will be responsible for planning the layout of the factory and providing designs for the plant and equipment, and will be responsible for its erection and setting to work. I.C.I. will also provide all the technical "know-how" required to operate the factory, and also continuing information on research. Initially all the management staff required and a number of key workers will come from I.C.I., but the Company will train Indians to take over responsible positions.

By agreement with the new company, I.C.I. (India) Ltd. will handle the distribution and sales of the India-manufactured explosives, operate the extensive series of magazines which they own throughout the country, and continue to give their technical services to consumers in India.

Agreements embodying these arrangements have been concluded after discussions in New Delhi between the Ministry of Commerce and Industry of the Government of India and a mission of seven from I.C.I., including Head Office staff from London and technical staff from the Nobel Division. They were assisted by I.C.I. (India) staff. Full discussions were also held with the Government of Bihar at Patna.

The agreements were initialled on behalf of the Government of India by Mr. H. V. R. Iengar, Secretary of the Ministry of Commerce and Industry, and on behalf of I.C.I. by Mr. R. C. Todhunter.

ALKALI DIVISION

£500 for a Mouse

For many years mice have caused trouble and expense in the Division ("mouse" is the term used for a device employed in cleaning brine and water mains). Up to the present time a heavy metal mouse has always been used, and its length has meant that ordinary short-radius bends could not be negotiated. This caused a great deal of trouble for maintenance engineers, since bends had to be removed and the mouse used to clean the intervening straight lengths. To avoid this trouble it would have been necessary to replace the bends with new and expensive ones of large radius.

Mr. Jim Scott, a super chargehand fitter in the Brine and Water Works, has witnessed this "mouse" trouble for many years. Recently he made a suggestion he had been turning



Mr. Jim Scott (right) receives a cheque for £500 from Mr. S. Alty

over in his mind for some time. Why not replace the metal mouse with one made simply of a straw ball with barbed wire wrapped round it?

A straw-ball mouse was made, and Mr. Scott's feelings as it was put to the test can be imagined. But his mouse proved an instant success. It travelled along the four miles of main

from Lostock to Winnington with no other help than the pressure of water behind it, it took the corners without any trouble at all, and it thoroughly cleaned the main.

Under the Division's suggestion scheme Mr. Scott receives £500—an award based on the savings, proved and prospective, that will be effected by his mouse within the Brine and Water Works.

Central Council Appointment

At the Central Council meeting in November Mr. Joseph Parkes of Wallerscote Works was elected chairman of the Workers' Section of the Central Council. This is the first time that this honour has fallen to a member of the Alkali Division.

Mr. Parkes, who is Sports Secretary and assistant secretary of the Production Committees at Wallerscote, has been a works councillor for over twenty years, serving several times on Division and Central Councils. His interest in committee work does not end here: he is also a trustee of the I.C.I. Workers' Pension Fund and of the Mond Pension Fund; he is chairman of the Children of the Unemployed (Assistance) Fund, and he has been a member of the Management Committee of the I.C.I. Workers' Friendly Society.

Mr. Parkes carries his enthusiasm for public service into his private life. An appointment that followed very closely upon his election to the Central Council was that of chairman of the Executive Committee of the Northwich and District Council of Social Service. He is a keen church worker in the parish of Rudheath.

Mr. Parkes joined the Company in 1919 after service in the first world war and has been at Wallerscote Works since production started there in 1926. As Sports Secretary he is, of course, interested in all sports. In his younger days he was a soccer player, but now he is an enthusiastic supporter of Warrington Rugby League team.



Four smart WRACs: Dorothy Burton, Sybil Purkiss, Beryl Pearce and Pamela Cragg

Northwich WRACs shine at Drill

Twelve girls from the 321 Battalion Cheshire WRAC/TA at Northwich have been making quite a name for themselves recently by their successes in a drill competition. Firstly, they competed against other teams from their battalion for the honour of representing it at the North-West District drill competition held at Preston on 27th September. They won the right to appear at Preston, and there they outshone every other team, coming away with the cup. Two of these girls at Preston were Private Beryl Pearce, a tracer in the Winnington Research Department, and L/Cpl. Dorothy Burton, who works in the Canteen at the Brine and Water Works. They, however, are not the only Alkali Division girls who report to Darwin Street every Tuesday evening for their very worthwhile training—Margaret Edwards, Pamela Cragg and Sybil Purkiss, all of the Central Sales Ledger Section, are other members of this enthusiastic section of "Terriers."

Not content with these successes, the girls scored a fine victory at the final of this drill competition held at Chester at the end of October. Now they are champions of the whole of Western Command—a very commendable achievement, of which they and their instructors are justly proud.

Drowning Man rescued from Clyde

A 61-year-old man who fell into the Clyde owes his life to members of the crew of the Alkali Division coaster *Polythene*.

When the cries for help were heard the first man on the spot was Seaman Angus McKinnon, who managed to snatch the man from the five-knot spate. By that time Captain Holleran and the mate, Mr. Alex Beaton, were at hand, and they dragged both men back on board.

The *Polythene* has been in the news before. On 30th September she gave assistance to a naval vessel which had broken down in bad weather. The *Polythene* saw her safely into the hands of the Navy, and a warm letter of thanks was received from the naval officer in charge, Clyde.



Seaman Angus McKinnon

Fuel Efficiency at Winnington

In 1874, when Winnington Works started production, 28 trucks of coal a day were needed to maintain output. In 1910 the coal needed for the same output was 7 trucks, in 1930 5 trucks. Today the figure is down to 4. These were some of the facts illustrating economy in fuel consumption which were shown on the Alkali Division stand at the National Fuel Efficiency exhibition at Manchester.

The exhibition was held under the auspices of the Combustion Engineering Association at the City Hall. It was opened by the Earl of Derby and lasted for ten days.

Scouts build New Headquarters

Scouts of the 1st Winnington Group—which includes many Division employees—were recently given by Salt Division the

DYESTUFFS DIVISION

Presentation to Dr. Cronshaw

Dr. C. J. T. Cronshaw, who retired from the board of I.C.I. a year ago, has been presented by his friends in Dyestuffs Division and I.C.(P) with a bronze bust of himself and a crystal cut-glass vase.

There were 800 people present in the cafeteria of Hexagon House on 28th October to see Dr. Cronshaw receive the gifts. Mr. C. Paine, the Division chairman, said how glad Dr. Cronshaw's friends were to welcome Mrs. Cronshaw "as, no doubt, on many other previous occasions she stands behind her husband in a crisis."

Dr. Cronshaw handled the "crisis" in his usual felicitous way when he replied to Mr. P. K. Standring's speech asking him to accept the gifts "as a token of our real affection for him and the esteem in which we hold him." Describing his experience in sitting for the sculptress, Miss Fiore de Henriquez, Dr. Cronshaw said: "I learned that apart from large groups the two best subjects for the sculptor are the young child, since he is quite natural and completely uninhibited, and the elderly, who bear upon their heads and faces the marks of their experiences and the ravages of time. This Henriquez bust is necessarily the work of very many people. Firstly, of course,



Winnington scouts rebuild their H.Q.

use of an old building in the home farmyard of Vale Royal Estate.

When they came to investigate the building they found it riddled with dry rot. They decided on a drastic course, and levelled the building to its foundations. Now they are busy rebuilding it and, as the picture shows, seem to be turning into first-class bricklayers.

Cheshire Railway Enthusiast

A nice slow railway journey, with plenty of stops, reversals and starts, is what Mr. G. H. Gaskell (Division Library, Winnington) likes. He is a member of the Lancashire and North-West branch of the Railway Correspondence and Travel Society, which recently arranged a rail tour over branch lines in Cheshire, some of which have been abandoned for passenger traffic.



Mr. G. H. Gaskell

The tour took members over the lines of the Grand Junction Railway, the West Cheshire Railway, and London and North-Western/Great Western joint lines. There was no grumbling about "standing room only," for many of the enthusiasts crowded into the driver's compartment of the push-and-pull unit and stood there in preference to sitting down in the carriages.

Six and a half miles of the journey ran along the single track that leads from Winsford Junction past Falk's Junction to the I.C.I. Salt Division sidings.

Mr. Gaskell has been interested in railways since boyhood. He was brought up in Staffordshire, and recalls how he would go some considerable distance out of his way just for the treat of riding home from work on the engine of one of the local trains. He is a member of the Railway and Locomotive Historical Society of Boston, Mass., which recently published in its journal his paper "The Origin of Locomotive Type Names."



Mr. Standring presents Dr. Cronshaw with a bust of himself and a crystal vase

of the young and brilliant artist whose work it is; secondly, of the large number of able and influential persons with whom I had the rare privilege of working alongside; and finally myself, who have been the medium, both willing and unwilling, upon which all the conflicts, all the victories as well as the defeats, the frustrations and exaltations, have been faithfully and indelibly impressed."

Dr. Cronshaw said he was profoundly affected by the fact that so many of his friends had been moved to find in his 37 years' work enough of value to esteem and commemorate.

Trafford Park Works Manager Retires

Mr. C. G. Wenyon, Trafford Park Works manager, retired recently. He had been at Trafford Park for twelve years, and during that time saw the manufacture of penicillin develop from the laboratory scale of culture in glass dishes to the large-scale, deep-culture method in fermenters; during his period of office there was also a remarkable expansion in both output and variety of dyestuffs products.



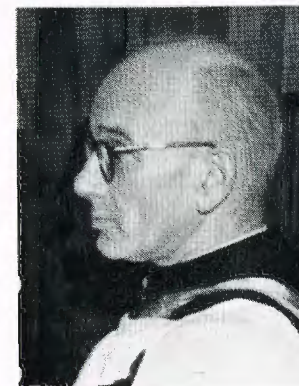
Mr. C. G. Wenyon

Mr. Wenyon, a native of the Orkneys, is probably best known at Huddersfield Works, where he spent 23 years, first in a key position in the manufacture of intermediates and later as assistant works manager. He had previously spent three years with the New Explosives Company at Stowmarket, which later became part of Paints Division.

At one time Mr. Wenyon held the Scottish amateur swimming championships for the 100 and 200 yards, and he has also been a Yorkshire chess champion. At Trafford Park he has been chairman of the Works Recreation Club, and he has recently seen the successful outcome of his long search for suitable club premises in the purchase of a large house in Stretford, Manchester.

Christmas Broadcast

The organist at the Christmas Day morning service broadcast by the B.B.C. at 9.30 a.m. in the North Home Service was Mr. A. D. Barker. The service, which was taken by the Bishop of Manchester, Dr. W. L. Greer, was held at the ancient parish church of Flixton near Manchester, which dates back to 1192, three years after the accession of Richard I.



Mr. A. D. Barker

Although Mr. Barker has had long experience and has held the post of organist and choirmaster at Flixton for over thirty years, it was a new experience for him to play for so great a congregation. Mr. Barker joined the Blackley works of British Dyestuffs Corporation Ltd., forerunner of Dyestuffs Division, some 33 years ago and was engaged on commercial work. In 1946 he was transferred to the newly constituted Division Supply Department at Hexagon House to assist in setting up and maintaining the Stock Records and Invoices Sections.

LIME DIVISION

70% Reduction in Accident Rate

For the first time the I.C.I. Accident Prevention Trophy has been won by the Division, with the remarkable reduction over their previous best accident rate of nearly 70%.



Mr. Ryder receives the Accident Prevention Trophy from Dr. Fleck at Central Council

Mr. L. B. Ryder, the Division chairman, received the cup from the Chairman of I.C.I. at the Central Council in November. Dr. Fleck pointed out that Lime Division's achievement in reducing their accident rate to less than 1 was all the more remarkable when it was compared with their frequency rate just after the war, when it was well into two figures.

Mr. Ryder said he was proud to receive the cup on behalf of the Division. "I am equally proud," he went on, "that Lime Division, like the rest of I.C.I., have 'broken unity.' It is something which a few years ago in our particular industry would have been regarded as nearly impossible."

METALS DIVISION

They built their own Houses

In the July 1953 *Magazine* was told the story of a handful of Metals Division pioneers who decided to build their own houses near Birmingham. In snow, fog, rain and mud they have worked at their site, and now, eighteen months after beginning operations, they are able to show the first results of their labours.

On Saturday, 5th December, the Kynoch Housing Association opened to view their first two completed bungalows at Leighswood Avenue, Aldridge. The opening ceremony was performed in the presence of about 120 members, friends and guests of the Association.

Welcoming the new tenants of the area, Councillor N. A. Tector (vice-chairman of the Aldridge U.D.C. and chairman of the local housing committee) congratulated the Association members on their work and said that this was a fine lead which many who found themselves without a home might follow.

Remarking that the cold and grey December afternoon made one appreciate to the full the value of a roof over one's head, Mr. M. J. S. Clapham (joint managing director, Metals

Division) praised the skill, initiative and tenacity of purpose of the builders, and said that to put in 22 hours a week on top of normal working hours was an effort of which anyone might be proud.

The party then inspected the two six-roomed bungalows—one already occupied—and visitors were impressed with their well-designed living space, their solidity, and the neatness of their finish.

The first tenants are Mr. Ivor Regan (Fitting Shop, Witton) with his wife and ten-year-old daughter Angela, and Mr. Arthur Jarvis (King's Norton No. 1 Works) with his wife and eleven-year-old son Derek.

Even though they are now comfortably housed on the estate, Mr. Regan and Mr. Jarvis will continue to put in the



One of the first tenants, Mrs. Regan, receives a bouquet from the Association's secretary, Mr. H. Irving

same amount of time helping to finish sixteen more bungalows and twelve two-storey houses for the other members of the Association.

Fireman First-aid

Leading Fireman P. E. T. Amphlett (Summerfield Research Station Fire Service) has recently set up a record in local first aid circles. For the third year in succession he has carried off the Porter Individual Challenge Cup, presented annually by the regional officer of the St. John Ambulance Brigade for the best individual effort in the Kidderminster Ambulance Division.



Mr. P. E. T. Amphlett

Mr. Amphlett, who has for many years had a keen practical interest in first aid, was a member of the Summerfield team which did noticeably well when this year it took part for the first time in the Metals Division eliminating round of the I.C.I. First Aid Competition.

NOBEL DIVISION

The Chairman visits Scotland

Dr. Alexander Fleck, Chairman of I.C.I., had an attentive audience when he addressed the girls in Ardeer's Detonator Canteen on 28th October. A reference to boyhood years as a pupil at Saltcoats Public School and his tribute to the remarkable handwriting of a headmaster, Mr. E. Wilson, whose name is a local legend, were greeted with cheers and applause. The speech was relayed to other canteens.

Dr. Fleck went on to divert his listeners with recollections of summer vacation work in the G.P.O. while he was a student at Glasgow University. He also conveyed his wide knowledge and appreciation of the Ayrshire countryside before ending his speech with a word of thanks for work well done.

During the afternoon he addressed a large meeting of works councillors, members of production staff and foremen's committees in Africa House. Dr. A. C. Richardson presided, and Dr. W. J. Jenkins introduced Dr. Fleck, who spoke on the past and future of Ardeer and Nobel Division.

Besides indicating the Company's intentions and immediate plans for Ardeer and Dumfries, Dr. Fleck made an appeal for still greater application of work study, in which Nobel Division was a pioneer, so that productivity would be progressively increased.



Miss Eva Russell, Ardeer Works Councillor, meets Dr. Fleck

On the previous day Dr. Fleck had been in Glasgow to see Nobel House, the Sauchiehall Street offices, and the Scotland and Northern Ireland Region establishment in Blythswood Square. In Glasgow he met and spoke with many members of the staff.

His Scottish visit began with a visit to the Division's Dumfries factory, where he was received by Dr. W. J. Jenkins and Dr. A. G. White. He took great interest in the 'Ardil' process and also saw the industrial nitrocellulose plant.

A Judge of Tumblers

Mr. Tom F. Brown, who works in Research Department and leads the Ardeer Recreation Club dance orchestra, Brown's

Merrymakers, is also a pigeon fancier of great repute—of such repute that he was invited to judge the mottle, rosewing and whiteside tumbler pigeon classes at the British Dairy Farmers' Show held at Olympia in October.

According to Mr. Brown, judging mottle tumblers is a hard job because the plumage effects are not natural but contrived by skilful plucking over several seasons. Every expert prefers his own type of plucking, which means that the arbitrary decision of the judge can be controversial.

Mr. Brown's decisions, however, were not questioned, and to increase his satisfaction four of his own splendid rollers were competing in another part of the show.

One of his cock birds came second in the class and his three hen birds got first, fourth and reserve prizes.

The "Brown" strain of roller pigeons is renowned, and is one of Britain's exports in a small way. Some weeks ago Mr. Brown sent off four pairs to South Africa, where the quality is appreciated. Last year he sent some to the same country, and one of them was first in the flying competition at the big Johannesburg show held recently.

In Tom Brown's Ardrossan loft there are about a hundred rollers and, just for interest, half a dozen bald-headed tumblers. If he is asked how much his stock is worth, Mr. Brown very candidly replies "A lot!"

A New Carnation

During the last two years a new carnation, "Mrs. Helen Wilson," has been exciting the experts throughout Britain.



Mr. Adam Wilson

This border carnation, raised from seed by Mr. Adam Wilson, a member of Ardeer's Engineering Department, is named in compliment to his wife. It bids fair to become a first-class show variety, because it has strength of plant, good erect habit and strength of stem, a perfect calyx, wonderful brightness of bloom—due primarily to a snow white ground feathered in deep rose markings—and large guard petals which are in perfectly circular formation. This splendid carnation resists the more

common troubles which can oppress show flowers.

The new carnation was raised from seed in 1949 and the stock was increased by layers. It first showed its promise in 1950, when it won a first in the seedlings class at Kelvin Hall. This success encouraged the owner not to exhibit the following year but rather to concentrate on increasing his stock and so provide more blooms to enter open competitions. During this season of expansion Mr. Wilson found out more about his carnation, which like many other varieties required naturalisation. Plants he had given to prominent carnation growers for trial away from the Stevenston locality did not come up to scratch during the first year but made very good grasses and good blooms in the following year. He also found that for show purposes it needed to be shaded from direct sunlight. By this means fading (a common fault with pink marked varieties) was reduced. Rain, however, had no effect whatever

upon the variety, whose colour was much refreshed by occasional showers. In 1952 Mr. Wilson was ready to take his flower to the big shows. At the Kelvin Hall exhibition fifteen blooms were displayed in four vases of three, with three spare flowers to allow for accident. These were entered in all the white ground classes for growers with fewer than 250 plants: four first prizes were gained, and for the rest of the day Mr. Wilson was besieged by enquirers who wanted layers from the new variety. During the following week his mail was swollen by requests from all over Britain. He did send some layers to experienced growers in Scotland and England, but these have not yet been in exhibition.

At the beginning of 1953 his confidence in the plant was confirmed when he entered for all the single-vase open classes for white ground varieties. Some of the blooms had been early and were already spent, and thus the number he had to choose from was reduced. From twenty blooms for four vases he gained three firsts, all in the open section, and one second in the section for growers with under 250 plants.

PLASTICS DIVISION

P.v.c. reduces Mining Hazards

The National Coal Board has announced that the systematic introduction of fire-resistant conveyor belting in all their mines has begun. Most of this belting is made from p.v.c., and Plastics Division has been intimately connected with its development.

It was the Cresswell colliery disaster of 1950 that focused attention on fire-resistant belting. In this underground fire eighty men lost their lives, and the fire was attributed to frictional heating of torn rubber conveyor belting. Interest was at once stimulated in the p.v.c. belting, in which not only



Conveyor belting in use in a mine

SALT DIVISION

Saving Souls in Winsford

Soul ! Soul ! for a soul-cake !
I pray you, good missis, a soul-cake !
An apple, a pear, a plum or a cherry,
Or any good thing to make us all merry.
One for Peter, two for Paul,
Three for Them that made us all.

Not so long ago this song might have been heard in the villages of Cheshire every 2nd November, sung by bands of children with blackened faces. In Winsford the custom of "souling" is still observed, but now the children sing:

Soul ! Soul ! An apple or two !
If you haven't got an apple, a pear will do;
If you haven't got a pear, a ha'penny will do;
If you haven't got a ha'penny, God bless you !

The custom of souling is centuries old, for its origin belongs to the Middle Ages, and Winsford is perhaps one of the few places where after a fashion it still survives. As its name suggests, souling was originally connected with All Souls' Day. On 2nd November, before the Reformation, people wearing black clothes and ringing a gloomy-toned bell used to walk the streets, pleading for prayers to be offered for their departed relatives and friends, and begging money for Masses to be said for their souls.

Present-day souling is a vestige of that practice, and soulers have long ago forgotten that the gifts enticed by their singing were originally intended, not for themselves, but for the liberation of souls in Purgatory. Formerly practised by adults, souling now seems confined to children, and Winsford adults probably wish that the children confined their souling to 2nd November.

Old Salt Retires

Mr. Joseph Atherton, who has retired after 40 years' service, was a waterman not merely by occupation but also, as one might say, by pedigree; for his family connection with the river Weaver goes back for more than a hundred years. His father, paternal grandfather, and at least three of his uncles all passed their working lives on the river.

In days gone by, some of the watermen owned and sailed their own craft, and these were dubbed "Number Ones" by those of the flatmen's fraternity who were less fortunate. Mr. Atherton's father, the late Joseph Atherton, who sailed the Weaver for sixty years, used to be a "Number One," his flat being the *Owen*. Some of Mr. Atherton's maritime blood came to him from his mother, for his maternal grandfather was a first mate on sailing ships which carried salt from Liverpool to Australia and returned to England loaded with wheat.

Mr. Atherton's career on the Weaver started aboard John Garner & Co.'s *Algeria* under the eye of his father before the five years' apprenticeship term was the rule. In those days the watermen, always bound together by strong ties, were



Mr. Joseph Atherton

the p.v.c. is non-inflammable but to a large extent the fabric interlayers.

Since that time the Division has been actively concerned with developing methods of making the p.v.c. belting. Their technical service men have visited mines to see for themselves the conditions under which the belting has to work. They saw lengths of belting up to 1000 yards long travelling at speeds up to 250 ft. per minute, conveying coal at 500 tons per hour; lumps weighing up to 1 cwt. fall from one conveyor on to another; and, in some shallow seams, coal being conveyed on the lower half of the belting, which scraped along the floor.

In many sections of the mines rock dust and coal settle on the conveyor mechanism and, if they are allowed to build up, jam the belting. The resulting friction might cause the kind of fire that occurred at Cresswell if the belting is made of inflammable materials.

P.v.c. belting is now accepted as being one answer to such fire risks, and in addition, because of its wearing properties, may reduce the National Coal Board's annual bill for belting replacements (at the moment there are 18 million feet of rubber belting in British mines, and the annual replacement bill is £15 million). The Board's first target is to replace 10% of the total quantity of belting in use underground with the non-inflammable type. The Mineworkers Union is anxious to include in the new Mines Act now being drafted a clause which would make it compulsory to install only p.v.c. belting; and Sir William Lawther, who is secretary of the Miners International Federation, is quoted as saying that he will take steps to see that the belting has the blessing of the Federation, which embraces all countries outside the Iron Curtain.

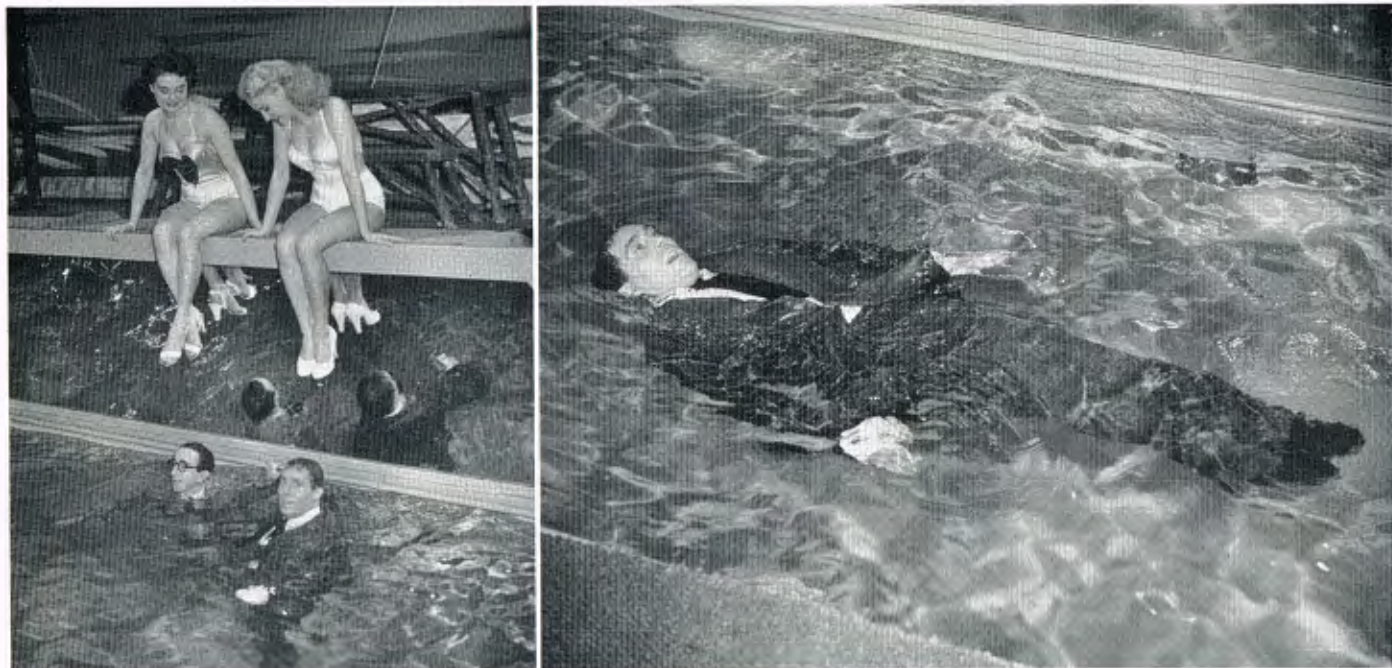
I.C.I. (INDIA)

Sixpennorth of 'Agrosan'



The photograph in the August issue of the *Magazine* entitled "Two-pennorth of 'Gammexane'" has prompted I.C.I. (India) to forward this photograph taken by one of their mycologists, Mr. J. R. Mhatre.

The picture shows a Plant Protection assistant, Mr. Bhat-tacherjee, selling 1½ oz. tins of 'Agrosan' GN to paddy cultivators in west Bengal. This was part of a campaign to popularise the use of seed dressings for paddy in India. During sowing season every village market in the area was visited by the I.C.I. sales van equipped with a loudspeaker, advertising posters and stocks of ready-for-sale tins of 'Agrosan' GN.



Pictures from *Wish You Were Here*, in which two comedians wear complete outfits of 'Terylene.' Left: Mark Baker and Christopher Hewett, fully clothed, in the stage swimming pool. Right: Christopher Hewett relaxes in his unshrinkable outfit.

regarded as the élite of the saltmen. Sailing with the boats was thought to be a fine job, and unless a youth was sponsored by a near relative within the circle his chance of becoming a waterman was slender.

Mr. Atherton remembers that his first day's work began on a bitterly cold Monday morning, when the *Algeria* left Winsford at 2 a.m. and arrived at Liverpool eight and a half hours later. For his first trip he received 1s. 6d., to which each of the other members of the crew contributed 6d. As time went on he sailed with the *Fanny*, *Aston*, *Abyssinia* and *Wrenbury*. In 1929 John Garner & Co. were taken over by the Salt Union, and a few years later he was posted as captain to his last barge, the *Nil Desperandum*. This was the fine old vessel which, when her day was done, remained true to her name by defying all attempts to scuttle her in the Flashes. Nobel Division was eventually called in to despatch her with explosives.

Six and a half years ago Mr. Atherton succeeded Mr. Harry Royle as the Distribution Department's craft runner, the position he was holding at the time of his retirement.

'TERYLENE' COUNCIL

'Terylene' prevents that Shrinking Feeling

When two characters called Pinky and Lou come on stage in the first act of the revue at the London Casino, *Wish You Were Here*, they are seen to be immaculately dressed: their suits fit enviably well, their trousers are beautifully creased, their ties without a crease, and their shirts fresh, apparently, from the laundry. Yet every evening they are thrown full-dressed into a swimming pool which occupies the centre of the stage.

A pretty problem for the wardrobe mistress, some people think: a shrunken suit to be thrown away every night and an almost inexhaustible supply of dry shirts, ties, socks and underwear called for.

The wardrobe mistress actually finds the act entails little trouble, and the secret is 'Terylene.' Pinky and Lou (played by Christopher Hewett and Mark Baker) wear complete outfits of 100% 'Terylene': suits, underwear, shirts, ties and socks. As soon as the curtain falls, these clothes are passed at once to the wardrobe mistress, who, following the instructions given her by the 'Terylene' Council, hangs them in a warm room, leaving them to drip.

By the following evening Pinky and Lou find that their 'Terylene' can be worn again—completely dry, unshrunk, of perfect shape, and with the original trouser creases still smart and knife-like.

* * *

OUR NEXT ISSUE

Once again Arthur Horowicz enlivens the *Magazine*. This time he has illustrated an article on the making of sulphuric acid with some very successful drawings of plant at the Marsh and Wigg Works of General Chemicals Division.

For the colour feature we have some specially taken photographs—two of them full page—of London fashion models wearing 'Terylene' dresses; and to match this, on the front page of the *Magazine* there is a cover girl, also wearing 'Terylene.'

There are two other articles. One is an account of a very ancient tradition, dating from the Norse invasion of the eighth century—a tradition of fishing the salmon on the Solway Estuary with what is called a haaf net. The fisherman in question, a payroll worker from our Powfoot Factory, landed on this particular day last year a catch of twelve sea-trout and one 12 lb. salmon.

Our final article is the one which won the Holiday Competition—for Holidays at Home. It is about the seafaring activities of the miners at Buckhaven in Fifeshire.

Sherlock Holmes

REACHES HIS CENTURY

By W. S. Bristowe (Central Staff Department)

Illustrations from the original drawings by Sidney Paget for the Strand Magazine by courtesy of Messrs. G. Newnes Ltd.

JUST as history has been embellished by myth, so Sherlock Holmes has become part of our national story and his home in Baker Street listed with the Tower of London as a place to be seen by visitors from overseas. Even though we are not sure of the actual house, our belief in his existence is so clear that any mention of Baker Street is enough to conjure up visions of his dark aquiline features bathed in a haze of tobacco smoke.

Holmes and Baker Street are linked in fame more solidly than even Dr. Johnson and Fleet Street, as was shown during the 1951 Festival of Britain, when crowds flocked to see the Sherlock Holmes exhibition arranged by the enlightened Borough Council of St. Marylebone. There in Baker Street for all to see were his pipes, his Persian slipper, his violin, and souvenirs from many of the singular cases he brought to a successful conclusion.

Every reader of this article has heard of Sherlock Holmes, and many will have read all the sixty published cases (now printed in two omnibus volumes by John Murray). Holmes himself once said in reference to his friend and chronicler, Dr. John H. Watson, "I am lost without my Boswell" (*A Scandal in Bohemia*), yet Watson never really helped us to find so complete a picture of Holmes as Boswell painted of Dr. Johnson.

Tantalising gaps in Holmes's life-story are left unfilled, and Watson is equally reticent about his own affairs. To what university, for instance, did Holmes go, and when was he born? How many times was Watson married, and why did he forsake Holmes for a year in 1896?

"You know my method," said Holmes. "It is founded upon the observance of trifles" (*The Boscombe Valley Mystery*). Can any trifles be found which will enable us to solve any of these mysteries?

A careful reading of all Watson's chronicles will satisfy



most people that the identity of Holmes's university is impossible to determine. Although claims by London University now seem to have been abandoned, a ding-dong battle has been pursued between Oxford and Cambridge, first one gaining the upper hand and then the other. The contestants include Miss Dorothy Sayers, Mr. T. S. Blakey, and Mr. Christopher Morley on the side of Cambridge, with Monsignor Ronald Knox, Mr. Gavin Brend, and Mr. S. C. Roberts in favour of Oxford. Electing myself as umpire, I will summarise the two cases and then give my verdict.

It has been deduced that Holmes started his university career in 1871. Those who favour the Cambridge hypothesis argue with some justice

that at that date a man who intended to read science would select Cambridge in preference to Oxford.

In the Gloria Scott case it is recorded that Trevor's bull-terrier froze on to Holmes's ankle one morning as he "went down to chapel." The same paragraph makes it clear that this incident occurred during his first two years at the university, and this is said to be an argument in favour of Cambridge. Dogs are not admitted into colleges at either university, so he would not have met the dog between a room in college and the chapel, and it is only at Cambridge where the first two years are spent in lodgings outside the college.

Mr. Christopher Morley recalls a Sidney Paget's drawing of Holmes wearing an unmistakable light blue hat-ribbon while on vacation in the Norfolk Broads. It was Miss Dorothy Sayers, however, who appeared to deliver the knock-out blow to Oxford claims by finding in the *Book of Matriculations and Degrees* that Mr. T. S. Holmes had matriculated at Sidney Sussex College in 1871 and had subsequently gained first-class honours in the Science Tripos!



"... Holmes gave me a sketch of the events." (The Adventure of the Silver Blaze.)

Rising from this seemingly mortal blow, the supporters of Oxford return to the attack. Too much, they say, has been made of the bull-terrier incident, since dogs were allowed to be chained outside the porter's lodge and in any case Cambridge men seldom had to live their first two years out of college in those days. As to Mr. T. S. Holmes, he has been identified as the Chancellor of Wells Cathedral.

Mr. Gavin Brend and Mr. S. C. Roberts both point out that the story of the Missing Three-quarter makes it unthinkable that Holmes was a Cambridge man. What Cambridge man is unaware of a late train from London at 11.15, or speaks of "running down to Cambridge," or is unaware that the surrounding countryside is flat, or, on arrival at Trumpington, says "this *should be* the village of Trumpington"? Nor would any Cambridge man speak of being "stranded and friendless in this inhospitable town"!

If a "painful scandal" occurred at Holmes's own university he might have wished to conceal its identity by speaking of it as Camford, as he does in the case of the Three Students. That "Camford" was Oxford seems clear from the fact that some weeks in the town could not have left them so ignorant of the geography in the Missing Three-Quarter case a year or two later if it had been Cambridge. Furthermore Holmes's reference to the College "quadrangle" suggests not only that he was in

Oxford but that he was an Oxford man himself, because in Cambridge a quadrangle is known as a court.

Having shown that Oxford was the scene of *The Three Students* we should notice that Holmes knew the tutor, knew the four chief stationers' shops and their situation, found his way to the running track without difficulty at six in the morning, and was assumed by the tutor to understand the system of double doors fitted to the college rooms. Here there is evidence of a prior knowledge of Oxford in contrast to his ignorance of Cambridge.

Perhaps my own doubts as to "Camford" being Cambridge began in 1923, when E. Norwood took the part of Holmes in a film version of *The Three Students*. I put in a momentary appearance myself in the crowd which was gathered at Fenners to watch one of the three students

breaking the long jump record. Harold Abrahams, our own champion, had already jumped more than 23 ft. that season, and this impostor whom we were supposed to accept as a Cambridge man cleared scarcely 12 ft.!

Discarding all prejudice, my verdict goes to Oxford, and in this conclusion I am in the same camp as Mr. S. C. Roberts, a past vice-chancellor of Cambridge University.

Next, there is the problem of Holmes's date of birth. He would have been a man of 17 or 18 when he entered the university, probably the former on account of his early maturity and of men entering universities earlier then than now. Careful deduction seems to show that he entered the university in 1871.

This provides a birthdate of 1854, which receives general confirmation from a description of him being a man of about 60 in 1914, when he emerged from retirement to track down Von Bork (*His Last Bow*). With a birthday between January and September 1854 he would have been 17 at the beginning of the university year in October 1871, and I favour one of the early months, perhaps January, making him 17 $\frac{3}{4}$ when he started his career at Oxford.

On leaving the university Holmes came to London, where he lived for a time in Montague Street before he moved to Baker Street, where he was joined by Watson

in 1881. When we first meet Watson in *A Study in Scarlet* he is recovering from a Jezail bullet wound in his shoulder, but after being hurt to the quick by Holmes's criticisms of his literary talent he showed to what depths of self-pity he could sink by nursing his Jezail-wounded leg! (*The Sign of Four*). He did not have to wait much longer for the sympathy for which he craved. Mary Morstan married him after that case was completed in 1887.

The discovery of Watson's second marriage by Mr. S. C. Roberts in 1931 created a literary sensation only equalled in recent times by the revelations of Boswell's love life contained in his long-lost diaries. And then, as if this was not enough, the claim was made by Mr. H. W. Bell that a third marriage had been detected, or at least suspected!

Mary Morstan must have died in or before 1894, because in that year Watson disposed of his medical practice and returned to Holmes in Baker Street. Why then did he leave Holmes again in 1896? Mr. Bell's suggestion of a quick marriage lasting only a year is based on nothing more substantial than his absence coupled with the knowledge that he was a ladies' man. Mr. Brend dryly reminds us that we are dealing with Dr. John H. Watson, M.D., not Bluebeard, and then advances the more plausible theory of a quarrel with Holmes.

He points out that before his marriage Watson had known nothing about horses. Any racing man can see this from a careful study of the Silver Blaze case. Here Watson refers indiscriminately to the "Wessex Cup" and the "Wessex Plate" as a race for four- and five-year-olds, and he says the ring roared "Fifteen to five against Desborough"! This is the faulty reporting of a complete novice, but when we come to the case of Shoscombe Old Place in 1895, a year or two after the loss of his wife, we find the following question and answer:

"By the way, Watson, you know something of racing?"

"I ought to. I pay for it with about half my wound pension."

Here is demonstrated a distressing change in Watson. He had taken to gambling in consolation for his wife's death, and this may well have led Holmes to remonstrate in his usual forthright manner. We can well imagine the sensitive Watson nursing his Jezail-wounded limb until he

could bear it no more and then taking his departure with dignity affronted.

That they yearned for each other's company is shown by Watson's return in 1897, when Holmes invited his aid in the Veiled Lodger case. But just as Watson had succeeded in weaning Holmes away from drugs, Holmes had cured Watson of gambling. Horses are mentioned no more, and Watson even allowed Holmes to take charge of his cheque book! We find Holmes saying "Your cheque book is locked in my drawer, and you have not asked for the key" (*The Dancing Men*, circa 1898).

Trifles, perhaps, but highly significant trifles.

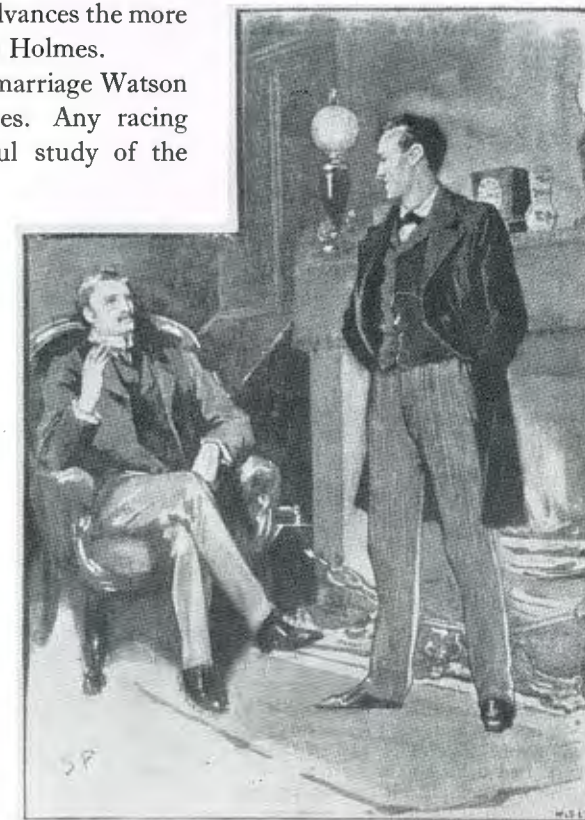
There is no doubt about Watson's second marriage in 1902. Holmes himself says "The good Watson had at that time deserted me for a wife, the only selfish action which I can recall in our association" (*The Blanched Soldier*). The wording is so curious that three conclusions can be deduced from it.

First, that this wife differed from Miss Morstan in having no cause for gratitude to Holmes. In consequence she would not allow her husband to neglect his practice as Miss Morstan had done in order to help Holmes.

Second, that the attempts to identify her as one of the women in Holmes's cases are fruitless, as she was probably one of Watson's attractive patients. And third, that the tinge of bitterness was caused by Holmes's realisation of such dependence on Watson's company that he would be unable to carry on without him. He retired in the following year aged 49 while still at the height of his powers.

Although we knew he retired to the southern slope of the Sussex Downs overlooking the Channel, we heard nothing of him after 1914 until the world was electrified by a letter in *The Times* on 19th October, 1950, from none other than the 98-year-old "John H. Watson, M.D." From this letter we learned that Holmes was still engrossed in the study of his

bees, and it is appropriate that I.C.I., with its wide interest in science, should be the first to extend to him its congratulations on the attainment of his century this year, and possibly this month.



A fireside discussion at Baker Street during the Scandal in Bohemia case



"Not a word to Bessie!"

Photo by A. Walker (Cassel Works, Billingham)